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10/651,459

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Uri Elzur

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11/22/2005

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EXAMINER

NGUYEN, BRIAN D

ART UNIT

PAPER NUMBER

2661

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/651,459

Applicant(s)

ELZUR, URI

Examiner

Brian D. Nguyen

Art Unit

2661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-12 and 14-29 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 23-29 are objected to because of the following informalities:

Claim 23, line 8, it is suggested to change "a host memory" to --the host memory--.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: Step (c) in claim 1 is not related to steps (a) or (b). The step of managing in claim 17 is not related to the step of parsing and processing.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2661

5. Claims 1, 4-12, and 14-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Mallory (2002/0034182).

Regarding claim 1, Mallory discloses a method for handling out-of-order frames, comprising: (a) receiving an out-of-order frame via a network subsystem; (b) placing data of the out-of-order frame in a host memory (reorder buffer 120 of figure 4); and (c) managing information relating to one or more holes (gaps) in a receive window (sliding window) (see paragraph 0011 for storing out-of-order frame and paragraphs 0060 and 0141 for holes and window).

Regarding claim 4, Mallory discloses the subsystem does not store one or more missing frames relating to the out-of-order frame (see, for example, figure 10 where bad, duplicate, or too old frames are dropped/not store).

Regarding claim 5, Mallory discloses network interface card (NIC) in figure 14 and paragraph 0145. Hayes shows NIC in figure 2.

Regarding claims 6-8, Mallory discloses placing the data of the out-of-order frame in the host memory if the out-of-order frame is determined to be inside the receive window and dropping the out-of-order frame if the out-of-order frame is determined not to be inside the receive window (see, for example, paragraphs 0057-0058 and figure 10 where Mallory teaches dropping or storing frames based on the age of the sequence number. Note that the too old sequence number is outside the receive window).

Regarding claims 9 and 10, Mallory discloses storing information (state information) relating to a new hole created by the placement of the data of the out-of-order frame wherein the

stored information resides on the network subsystem (see status table 122 in figure 4 and paragraph 0074).

Regarding claim 11, Mallory discloses the managed information resides on the network subsystem (see status table 122 in figure 4).

Regarding claim 12, Mallory discloses updating the window (see paragraph 0140).

Regarding claim 14, Mallory discloses mapping TCP space into host buffer space (see, for example, reorder buffer 120 in figure 4 where received TCP frames are stored (mapped) in the reorder buffer).

Regarding claim 15, Mallory discloses a memory whose memory usage scales with a number of holes in the receive window (see, for example, paragraphs 0059-0040 where Mallory teaches of buffering frames following a hole (gap) in a reorder buffer. Therefore, the memory usage in the reorder buffer must scale with a number of holes).

Regarding claim 16, Mallory discloses a memory whose memory usage does not scale with a number of out-of-order frames received (see, for example, paragraph 0063 where Mallory teaches checking the frame to determine if it is a reminder control frame. If it is, the frame is dropped. The reminder control frame that is an out-of-order frame and is dropped while the out-of-order data frames are stored in the reorder buffer. Therefore, the memory usage does not scale with a number of out-of-order frames received).

Regarding claims 17-22, Mallory discloses a method for handling out-of-order frames, comprising: parsing an out-of-order frame into control information and data information (see, for example, table 1 in page 4 and figures 6, 7, or 8 where the control bit (Ctl) specifies whether the frame is a control information frame or a data information frame); processing at least one of the

Art Unit: 2661

control information, the data information and context information to determine a buffer location in a host memory in which to place the data information (see paragraph 0011 where out-of-order frames are stored in the buffer); and managing receive window hole information, wherein the receive window hole information comprises TCP receive window hole information (see, for example, slide window in paragraphs 0140-0141).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mallory in view of Hayes.

Regarding claim 2, Mallory does not specifically disclose the out-of-order frame is received via a TCP offload engine (TOE) of the network subsystem or a TCP-enabled Ethernet controller (TEEC) of the network subsystem. However, the use of TOE or TEEC is well known in the art. Hayes discloses the use of offload engine (see, for example, offloading in the abstract). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the offload engine as taught by Hayes in the system of Mallory in order to support high bandwidth communications.

Regarding claim 3, Mallory does not specifically disclose the memory/buffer is a onboard or off board memory. However, to use an onboard or off board to store frames is a

Art Unit: 2661

matter of choice. Hayes explicitly discloses storing frames in memory (M) off from network interface card (NIC) (see figure 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to not store on an onboard memory as taught by Hayes in the system of Mallory in order to reduce the size of the onboard memory.

8. Claims 23-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mallory in view of Hayes and The admitted prior art (APA) (paragraph 09 of the background of the invention).

Regarding claims 23-29, Mallory discloses a system for handling out-of-order frames comprising a host comprising a host memory (reorder buffer in figure 4); process an out-of-order frame; placing data of the out-of-order frame in the host memory; and manage information relating to one or more holes in a receive window (see paragraph 0011 for storing out-of-order frame and paragraphs 0060 and 0141 for holes and window). Mallory does not specifically disclose a network subsystem coupled to the host via a host interface wherein the network subsystem performing the processing, placing, and managing steps. However, Hayes teaches of using a network subsystem including an auxiliary processor (NIC of figure 5) to perform processing tasks to reduce processing tasks performed by the host processor (see figure 5; abstract; paragraph 0036) and the APA, paragraph 09, discloses that the conventional offload engines may store out-of-order TCP segments in dedicated buffers attached to the offload engines residing on the NIC or a host memory. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the NIC with an auxiliary processor as taught by Hayes in the system of Mallory in order to reduce processing tasks performed by the host processor and storing the out-of-order frame in a host memory as

Art Unit: 2661

taught by the APA in the system of Mallory in order to minimize or eliminate a dedicated memory in the NIC to reduce cost of the NIC.

Allowable Subject Matter

9. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments filed 9/12/05 have been fully considered but they are not persuasive.

The applicant argued that claim 1 of the present invention recites “managing information relating to one or more holes in a receive window” and claim 17 recites “managing receive window hole information” and that Mallory does not teach “placing data of the out-of-order frame in a host memory” or managing information relating to one or more holes in a receive window”. The examiner disagrees because Mallory clearly teaches in paragraph 0011 that the receiver **buffers the out-of-order frame** in a receiver buffer and in paragraph 0060 Mallory teaches that if they are out-of-order ... buffer frames following a gap for a time **in a reorder buffer**. Also in paragraph 0060, Mallory teaches “**managing** information relating to one or more holes (gap) in a receive window” by buffering frames following a gap (hole) for a time in a reorder buffer so that if the receiver can fill the gap with retransmitted frames in time, the frames

Art Unit: 2661

can be passed to the next layer in sequence order. In paragraph 0141, Mallory further teaches of managing including updating the sequence number.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

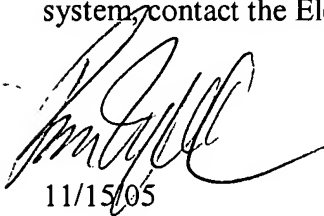
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian D. Nguyen whose telephone number is (571) 272-3084. The examiner can normally be reached on 7:30-6:00 Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau Nguyen can be reached on (571) 272-3126. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2661

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



11/15/05

BRIAN NGUYEN
PRIMARY EXAMINER